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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/052,886
Filing Date: January 18, 2002
Appellant(s): CHOUDHARY ET AL.

Brian W. Oaks
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/26/09 appealing from the Office action mailed 07/14/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7,224,906	CHO et al	5-2007
7,136,588	Islam et al	11-2006

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 12, 14-17, 19, 37, 39-45, 49, and 50 are rejected under 35 U.S.C. 102(e) as being anticipated by Cho (Patent No. US 7,224,906 B2).

Regarding claim 12, 37, Cho teaches generating a polarized local signal based on receiver-side feedback (reference numeral 2097 in Figure 24); receiving an ingress traffic signal ((reference numeral 2099 in Figure 24) comprising a first signal and a second signal, the first and second signals having the same wavelength, having different polarizations, and being modulated based on different data (i.e. the output of the transmitter of Figure 8); combining the ingress traffic signal including the first signal and the second signal with the polarized local signal to generate a combined signal (reference numeral 302' in Figure 24); splitting the combined signal into a first split signal (reference numerals 308', 310' in Figure 24) and second split signal (reference numeral 312', 314' in Figure 24) using a polarization beam splitter (inherent in hybrid 302' in Figure 24); detecting the first split signal (reference numeral 316', 318' in Figure 24); detecting the second split signal (reference numeral 312', 314' in Figure 24), and converting the

detected first split signal and second split signal into intended data streams (reference numeral C_1', C_2' in Figure 24).

Regarding claim 14, 40, 45, Cho teaches the method of Claim 12, wherein the polarization is circular (inherent in reference numeral 302' in Figure 24).

Regarding claim 15, 41, Cho teaches that the first split signal comprises a first component of the received signal (inherent in the use of 302' of Figure 24).

Regarding claim 16, 42, Cho teaches that the second split signal comprises a second component of the received signal that is orthogonally polarized (inherent in the use of 302' in Figure 24).

Regarding claim 17, 43, Cho teaches that the ingress traffic is optical (inherent).

Regarding claim 18, Cho teaches that the combined signal is split by a polarization beam splitter (reference numeral 302' in Figure 24).

Regarding claim 19, 49, Cho inherently teaches that the polarization of a first component of the ingress traffic signal is aligned to an axis of the polarization beam splitter (inherent in that separation takes place at the 302' in Figure 24).

Regarding claim 39, Cho teaches that system of claim 37, wherein the signal is received by an automatic polarization controller (inherent in 302' in Figure 24).

Regarding claim 44, Cho teaches the system of claim 37, wherein the local signal is provided by a continuous wave laser (column 24 lines 46-56).

Regarding claim 50, Cho teaches that the detecting means is a photodiode (reference numerals 316', 318', 320', 322' in Figure 24).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 46-48 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho.

Regarding claim 46, Cho differs from the claimed invention in that it fails to specifically teach that a quarter-wave plate controls the polarization of the system. However, the use of quarter-wave plates to control polarization is well known in the art. One skilled in the art would have been motivated to use a quarter-wave plate control the polarization of the system since they are readily available and relatively inexpensive. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a quarter-wave plate as the polarization controllers of the system of Cho.

Regarding claims 47-48, Cho differs from the claimed invention in that it fails to specifically teach that the combiner is a half-mirror or a 3dB splitter. However, both types of combiners are well known in the art and readily available. One skilled in the art would have been motivated to employ wither one in order to meet a design requirement or to use what was available at the time. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ either a half-mirror or a 3dB splitter in the system of Cho.

Claim 52 recites a combination of individually rejected elements and is therefore rejected on the same grounds as stated above.

5. Claims 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho in view of Islam (Patent No. US 7,136,588 B1).

Regarding claims 55-57, Cho teaches or obviates the limitations of claims 12, 37, and 52, but differs from the claimed invention in that Cho fails to specifically teach a polarization mode dispersion compensator operable to receive an optical traffic signal and to compensate the optical traffic signal for polarization mode dispersion. However, Islam teaches a polarization mode dispersion compensator (reference numeral 564 in Figure 8a) operable to receive an optical traffic signal and to compensate the optical traffic signal for polarization mode dispersion. One skilled in the art would have been motivated to include a polarization mode dispersion compensator operable to receive an optical traffic signal and to compensate the optical traffic signal for polarization mode dispersion in order to optimize the optical signal to noise ratio (column 22 lines 47-52 of Islam). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a polarization mode dispersion compensator operable to receive an optical traffic signal and to compensate the optical traffic signal for polarization mode dispersion.

(10) Response to Argument

Appellant initially argues that Cho's U. S. Patent No. 7,224,906 fails to qualify as prior art because there is no support in the parent application, Cho's U. S. Patent No. 7,111,677, for generation of a polarized local signal as shown in Figure 24 of Cho's '906 patent. However, Cho clearly discloses this feature numerous times throughout the disclosure of the parent patent.

Looking first at Cho's Figure 7a of the parent patent, the examiner notes the disclosure of a polarization controller feedback signal (reference numeral 336 in Figure 7a) output from electronic block (reference numeral 399 in Figure 7a) and fed back to a polarization controller such as polarization controller of Figure 4a (reference numeral 250 in Figure 4a; column 12 lines 58 – 67). As noted in the disclosure of Figure 4a which is positively linked to the disclosure of Figure 7a (column 12 lines 58-67), Cho's polarization controller (reference numeral 250 in Figure 4a) outputs a local linearly polarized optical signal that includes a second optical pulse stream called the framing signal (reference numeral 154 in Figure 4a and 7a). Given this, Cho clearly discloses generating a polarized local signal based on receiver side feedback, namely the linearly polarized output of the polarization controller (reference numeral 250 in Figure 4a) that is generated locally at the receiver based on feedback from the electronic block (reference numeral 399 in Figure 7a). Furthermore, Cho's locally generated linearly polarized optical signal is clearly combined with the ingress traffic signal (reference numeral 75a in Figure 4a and 7a) including the first signal (reference numeral 81' in Figure 4a and 7a) and the second signal (reference numeral 85' and 154 at the output of filter 162 in Figure 4a; reference numeral 154 in Figure 7a) at an optical hybrid (reference numeral 252 in Figure 4a, reference numeral 302 in Figure 7a) to generate a combined signal (reference numeral 156 in Figure 4b).

In direct rebuttal Appellant's contention that Cho '906 fails to qualify as prior art, the examiner notes that Cho '677 clearly discloses that the locally generated linearly polarized optical signal discussed above, e.g. the second optical pulse stream that contains the framing signal (reference numeral 85' and 154 at the output of filter 162 in Figure 4a; reference numeral 154 in Figure 7a), can be generated by a local light source at the receiver (column 4 lines 2-10).

Cho '677 further discloses the use of a local light source at the receiver at least twice more (column 4 lines 34-38; column 6 lines 23-27), thereby irrefutably providing support for the local light source shown in Figure 24 of Cho '906. As to the polarization of the local signal produced by the local light source, Cho '677 makes it clear that the polarization of the local light can be set (column 10 lines 10-21), thereby meeting Appellant's claim to generating a polarized local light signal. This feature in combination with Cho's disclosure of synchronously locking the signal output from the local oscillator (column 3 lines 54 – 65; column 4 lines 4-10; column 6 lines 23-27), combining the polarized local light signal with the ingress data signal including a first and a second signal in an optical hybrid (reference numeral 302 in Figure 7a), and providing receiver side feedback to a polarization controller (reference numeral 336 in Figure 7a) provides direct support for every feature relied upon in Cho '906 to meet the limitations of the claimed invention. Given all of the above, the examiner maintains that Cho '906 qualifies as prior art in that Cho '677 provides support for every structural element shown in Figure 24 of Cho's '906 and their respective features.

Turning now to Appellant's arguments against Cho '906, Appellant argues that Cho '906 fails to teach "receiving an ingress traffic signal comprising a first and a second signal, the first and second signals having the same wavelength, having different polarizations, and being modulated based on different data." Appellant substantiates this argument by noting that the figure relied upon by the examiner to meet these limitations is directed to a QPSK optical signal transmitter. However, that Cho discloses a QPSK optical signal transmitter is of no consequence considering that the claim language is not specific to any particular type of modulation format transmitter. The fact of the matter is that reception of the ingress traffic signal is clearly

disclosed by Cho as signal 2099 in Figure 24 and this ingress traffic signal, regardless of the type of modulation format used including QPSK, produces a signal that comprises a first signal (i.e. the optical signal contained within reference numeral 1834 in Figure 8) and a second signal (i.e. the optical signal contained within reference numeral 1835 in Figure 8), the first and the second signals having the same wavelength (reference numeral 1822 in Figure 8), and being modulated based on different data (reference numeral 1841, 1842 in Figure 8).

As to the first and the second signals having different polarizations, the examiner notes that the first and the second signal, like any optical signal, will experience polarization shifts in propagating through an optical fiber due to nonlinearities and/or imperfections in the circular symmetry of the fiber. In fact, Cho attempts to compensate for these random shifts in polarization by including a polarization controller (reference numeral 250 in Figure 16a; reference numeral 336 in Figure 19a; column 27 lines 23-28, column 30 lines 29-36) at the input of the receiver to return the polarization of the received signal to a linear state. Therefore, Appellant's claim to reception but not necessarily the generation at a transmitter of first and second signals having different polarization fails to patentably distinguishable the claimed invention from the cited prior art. Furthermore, Cho discloses the generation at a transmitter of first and second signals having different polarizations at least via disclosure of a polarization diversity receiver (Figure 21) capable of receiving such signals, polarization interleaving of odd/even groups of wavelengths (column 16 lines 66-67), and generation of optical signals having arbitrary polarization states (i.e. end of claim 1).

Regarding Appellant's argument that the Cho '906 fails to teach "splitting the combined signal into a first split signal and second split signal using a polarization beam splitter," the

examiner notes that Cho teaches exactly this via disclosure of polarization beam splitter (386) and (388) in Figure 20b that reside within optical hybrid 302' in Figure 24 (column 26 lines 32-47).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Agustin Bello/

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